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ABSTRACT

In two separate experiments, children (2nd and 7th graders) and adults generated oral descriptions of the picture stories in the WISC-R picture arrangement task. Comprehension of the stories was assessed by subjects' use of logical connectives and by mention of subtle themes in interpreting the more difficult stories. In both experiments and on both measures, adults exhibited better comprehension than second graders. However, only in experiment 1, where a non-canonical example story preceded the task, did adults also outperform the seventh graders. In experiment 2, the example was a canonical story and seventh graders performed as well as adults. (Author)

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Producing Stories for the WISC-R Picture

Arrangement Items

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Producing Stories for the WISC-R Picture Arrangement Items

Abstract

In two separate experiments, children (2nd and 7th graders) and adults generated oral descriptions of the picture stories in the WISC-R picture arrangement task. Comprehension of the stories was assessed by subjects' use of logical connectives and by mention of subtle themes in interpreting the more difficult stories. In both experiments and on both measures, adults exhibited better comprehension than second graders. However, only in experiment 1, where a non-canonical example story preceded the task, did adults also outperform the seventh graders. In experiment 2, the example was a canonical story and seventh graders performed as well as adults.

One major purpose of the present research was to learn more about the development of children's impressions of stories by analyzing the stories they produce. A child's spontaneous story production can provide valuable insights into the processes underlying story representation and comprehension (Glenn & Stein, in press). In recent years researchers have proposed various formal grammars for representing the structure and underlying logic of simple stories. The major assumption characterizing these approaches is that stories describe purposive behavioral sequences. Past work has certainly supported the conclusion that young children possess schematic knowledge regarding the structural components of stories as evidenced in their recall and comprehension of narrative information. Relatively little is known about the influence this knowledge has on children's generation of stories or about the ease with which these story grammars can be used to characterize the stories children produce.

In past research various unstructured prompts have been utilized to elicit stories from children (Glenn & Stein, in press). As an effort to provide more structured prompts, we have employed pictorial stimuli from the Picture Arrangement subtest of the Wechsler Intelligence Scale for Children - Revised-1974 (WISC-R). Another motivation for utilizing this widely known scale was to provide a first step in assessing the underlying psychological properties related to successful performance on the task. The task calls for children to arrange a series of picture sets so that each makes a logical story. Successful performance on this task requires interpretation of social situations and can be viewed as a measure of the ability to comprehend event sequences in a story (Sattler, 1974). Even though this picture task has been used with hundreds

of thousands of children over the past 30 years (Wechsler, 1949, 1974) there has been no systematic empirical evidence reflecting how children tell stories based on these picture sets. If such information was available we could begin to draw inferences about how these stories are actually being represented and understood by children.

We expected that developmental sensitivity to the organization of the picture stories would surface in the types of stories generated from the pictures. There are multiple reasons to expect this outcome, ranging from evidence about the acquisition of richer narrative "schemata" as children move through the school years (Stein & Glenn, 1978), to evidence of how children acquire a more complex understanding of theme, characterization, plotting, and dramatic tension in stories (Botvin & Sutton-Smith, 1977). Additionally we were interested in whether there was any relation between the way students described the correctly sequenced picture stories and their skill at sequencing them correctly. It could be argued that the better the quality of the student's underlying representation of the story, the more facility (s)he will evidence in organizing its pictorial form. Finally, we also considered an important task characteristic which might influence the quality of the stories produced; student's prior familiarity with a canonical or highly general story form. Some individuals, particularly younger children, may not have much experience in telling formal short stories to listeners. As a result, they may fail to have a clear sense of how to tell a simple and informative story. So, providing these children with a clear example of a well formed narrative might enhance the subsequent quality of the stories they construct from the picture sets.

To test the above ideas, two experiments were designed. In experiment 1, a group of second and seventh grade school children and a group of adults produced oral stories to each of the 12 picture sets in the WISC-R Picture Arrangement task. One week prior to this all children were individually tested with the standard version of the WISC-R picture sequencing task. Experiment 2 constituted a partial replication of experiment 1, calling upon a new group of second and seventh graders and adults to produce oral stories to all 12 stories again. This time, however, subjects heard a brief example story drawn from story grammar theory (e.g., Stein & Glenn, 1978) along with the example picture set prior to producing their stories.

In a previous analysis of the stories produced in response to the WISC-R task we focussed on the qualitative differences in the linguistic representations of each age level (reported in Yussen, in press). A simplified story grammar analysis was used to analyze the stories generated (Glenn & Stein, in press). As expected, there were striking changes from early childhood to adulthood in the types of stories produced. Children's stories were often fragmentary, incomplete, and lacked mention of motives, goals, and feelings of the characters. When a systematic canonical story example was provided; the older children were more likely to increase the sophistication of their stories.

The motivation for the present investigation was to analyze changes in other measures of story comprehension. Two measures were created to examine developmental changes in comprehension based on how children told stories. Differences were expected in 1) the children's use of explicit logical connectives (connective score) as well as 2) the student's tendency to mention the connecting theme

which made the more difficult stories sensible (theme score) (see example later in the paper).

Method

Subjects. In each of experiments 1 and 2 there were 36 students, 12 students each from second and seventh grade and 12 college students. The children were drawn from two middle class schools in the Madison, Wisconsin area. Adults were volunteers recruited from classes in educational psychology.

Procedures. All students were tested individually during one 25 minute session. In addition, all children in experiment 1 were administered the formal Picture Arrangement task from the WISC-R one week before they generated stories for the picture sets. Each student was asked to produce stories orally for all 12 picture sets following brief instructions. All stories were tape recorded and transcribed at a later date by a secretary unaware of the children's ages and the hypotheses of the study. Students were given as much time as they needed to generate a story. Instructions were reread if a student hesitated and all students were encouraged to tell any story they wished.

During the instructions in experiment 1 the example picture set from the Picture Arrangement task was displayed and the corresponding story from the WISC-R manual was read. After this example story, the students were asked to compose their own stories for the remaining picture sets. Each picture set was arranged in the correct order (as prescribed in the WISC-R manual) from left to right in front of the student. The 12 picture sets were presented in the same order as in the formal WISC-R arrangement task.

The procedures for experiment 2 replicated those of experiment 1 with the

exception that students were read a different example story during the presentation of the example picture set. The example story presented in experiment 2 was composed of five sentences that corresponded to the five episode categories of the narrative grammar developed by Stein and Glenn (1978) (see Figure 1).

Results

Scoring

The transcribed story protocols were scored in a number of ways. For the purpose of this paper only two of the employed measures will be reported. One score was obtained which indicated the number of higher level connectives present in a child's stories. Examples of the types of connectives that were scored were; but, because, when, so, temporal markers such as, first, second, ..., finally, and other explicit instances of causal links between propositions. Two judges underlined all appearances of these linking words. The child's "connective score" was the total number of connectives used across all 12 stories.

A second measure obtained for each student was based on the stories produced only for the last six picture sets. These latter stories are presumed to reflect more subtle story themes than the earlier ones. A panel of adult judges specified a list of propositions or ideas required to evidence comprehension of these subtle themes. For example, one of the WISC-R items shows a plain, middle-aged woman looking into a mirror to one side and drawing a picture of a woman on a canvas directly in front of her. When the drawing is finished, the canvas reveals a beautiful young woman. The story makes sense if it is interpreted as an effort to create a self portrait and if the discrepancy is noted between the artist's actual appearance (plain, unattractive) and her imagined self (the

beautiful woman in the portrait).

A student received a score of 1 or 0 for each of the last six stories to reflect either comprehension or noncomprehension of these themes, respectively. In the self portrait story, for example, children had to indicate that the person was attempting to paint herself and that the painting was discrepant from reality. Thus, the total possible "theme score" for each student ranged from zero to six.

Developmental Comparisons

Separate analyses were performed for each measure. The assumptions for normality were suspect because of the skewed distributions of the data (Marascuilo & McSweeney, 1977). Thus, three pairwise nonparametric rank contrasts were formulated to test for differences between the age levels. The type I error(α) was set equal to .05 each comparison tested. In both experiments, significant age differences were observed on each of the measures. However, the locus of the age shift differed in the two studies. Table 1 and 2 show the means and standard deviations on the original data for each of the measures.

Insert Table 1 and 2 about here

In experiment 1, adults were more likely to understand the subtle themes of the stories and produced more connectives than either second or seventh graders, all $Z_s > 2.829$, $p_s < .05$. The seventh graders did no better than the second graders on either measure. In experiment 2, the adults again outperformed the second graders on both measures of comprehension, both $Z_s > 3.158$, $p_s < .05$. However, when compared to the seventh grade performances, the adults did no better on either measure. Furthermore, the stories produced by the seventh grade students

after listening to a canonical story example included more of the subtle themes of the stories than the second grade students $Z = 3.043$, $p < .05$.

Relationship Between WISC-R Performance and Both Measures

Table 3 shows the correlation between the Picture Arrangement subtest raw score and the Connective and Theme scores (for experiment 1 only). There was a significant correlation found between the seventh grader's Connective score and their WISC-R raw score. This was not the case for second graders. No significant correlation was obtained between the Theme score and the WISC-R measure at either grade level. (No WISC-R subtest scores were available for adults, of course, since the test was not appropriate for adults and we did not administer it to them.)

Insert Table 3 about here

Relationship Between the Connective and Theme Score Measures

Table 4 shows the correlation between the Connective score and the Theme score for each grade level. In both experiments 1 and 2 a significant correlation was obtained among these measures for the children (second and seventh grade) but not for the adults.

Insert Table 4 about here

Discussion

The main purpose of this study was to investigate the linguistic form of stories used to capture the underlying event structure depicted in a widely used measure of intellectual ability. The major findings can be summarized briefly. Remarkable developmental differences were found between the children (second and seventh grades) on the one hand and the adults on the other in the types of information included in their stories. Adults used more logical connectives and often mentioned more subtle themes that maintained a higher level of logical continuity. Children's stories were often tied together with loose connectives (i.e., and, then) and lacked the higher level themes which added to the story line. In experiment 2 older children (seventh grade) benefited from the alteration in the instructional task. When a canonical story example was made available during instruction, the older children produced more logically connected stories than the second graders and their story themes were more characteristic of those produced by adults. Thus, older children's story productions are readily influenced by a "story telling scheme" which only required one example to be activated.

Although comparisons across experiments are unjustified it seems interesting to note that children (second graders) who had received a "schematic" story example in experiment 2, incorporated many more explicit connective words in their stories. The influence of a schematic example, however, did not influence the youngest children's performance on a "comprehension" measure related to their general thematic awareness. Before concluding that the younger children truly lack a higher level understanding of these stories, it will be necessary,

of course, to consider whether younger children need more extensive experience with well-formed examples or training in story telling.

The significant correlation between the seventh graders' standard WISC-R Picture Arrangement task and the presence of explicit connective words in their stories suggests that the ability to sequence a series of pictures is related to the linguistic representation one might produce to describe the event. However, the lack of correlation between the WISC-R task and the presence of thematic integration or logical connectives in the second graders is not surprising, in retrospect. As we have seen in an earlier study (Rembold, Bingham & Yussen, Note 1) the picture sequencing task on the WISC-R is apparently independent of language activities for these youngest children. If the sequencing task is really a measure of social comprehension, it is a remarkable case of language independent comprehension for children at the second grade level.

It was also expected that children who utilized more causal connectives in their stories, as opposed to those who utilized fewer causal and more temporal relationships, might also demonstrate an explicit appreciation of the logical necessity or thematic integration of the diverse story elements. The results of this study, without presuming any causal relationship, certainly indicate that the explicit connectivity expressed in a story relates to children's appreciation of the thematic inferences. No such relationship was found between these measures for the adults in each story, however. A possible explanation for the lack of correlation between these measures for the adults is that other measures of story comprehension may more adequately portray the adult's story productions. In fact, in a subsequent analysis when the structural components

of the stories were classified based on a simplified story grammar system, we found that the inclusion of a goal statement was significantly correlated to the adult's (but not children's) tendency to mention the inferential themes of the more complex stories.

In general, these findings support the need to further examine the linguistic properties that may influence successful performance on this widely used pictorial sequencing task. The fact that developmental differences were found in the level of sophistication in the stories produced for the WISC-R Picture Arrangement items and that a schematic story example influenced older children's subsequent story productions supports past work in prose analysis which shows that the ability to activate an implicit story schema to reorganize narrative information improves with age (Buss, Yussen, Mathews, Miller & Rembold, in press).

To our knowledge, the present experiments constitute the first effort to obtain a linguistic description of the WISC-R picture stories with such a healthy sample of stories (432 per experiment). This data base should serve as a rich resource for other researchers who wish to pursue work in the area of story comprehension and prose analysis.

Reference Note

1. Rembold, K., Bingham, A., & Yussen, S.R. Pictorial sequencing ability: Evidence for its independence from language processes. Manuscript submitted for publication, 1982.

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Table 1

Means and Standard Deviations for the "Connective Score" of the Second-,
and Seventh-Graders, and Adults in Study 1 and 2

Grade	Study 1		Study 2	
	$\bar{X}$	SD	$\bar{X}$	SD
2nd	7.750*	9.706	13.583	10.595
7th	7.500	5.231	19.750	9.343
College	22.333	11.994	35.917	24.508

* Scores ranged from 2-95.

Table 2

Means and Standard Deviations for the "Theme Score" of the Second-,
and Seventh-Graders, and Adults in Study 1 and 2

Grade	Study 1		Study 2	
	$\bar{X}$	SD	$\bar{X}$	SD
2nd	1.000*	1.128	1.333	1.614
7th	1.167	1.115	3.333	1.155
College	2.833	1.642	4.083	1.311

* Scores ranged from 1-6.

Table 3

Correlations Between WISC-R Picture Arrangement Raw Score
and "Comprehension" Measures in Experiment 1

Grade		CS ^b	TS ^c
2nd	PA ^a	.308	.437
7th	PA	.683*	.268

Note: ^aPicture Arrangement Raw Score, ^bConnective Score, ^cTheme Score

* $p < .05$

Table 4

Correlations Between Connective Score and the
Theme Score in Each Experiment

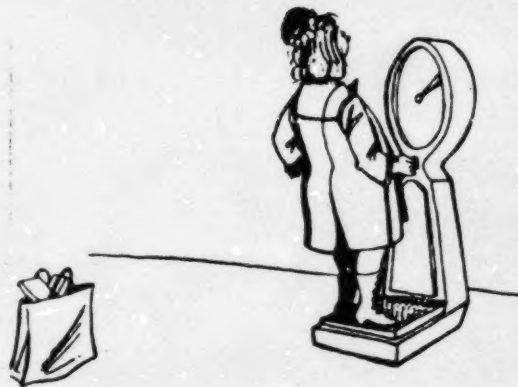
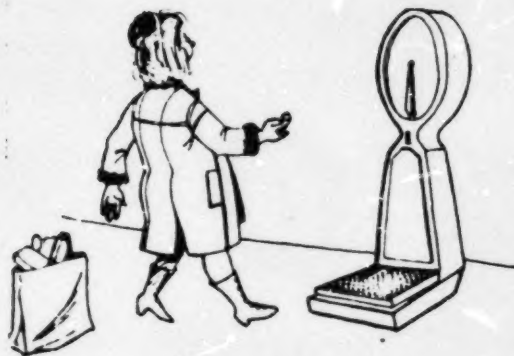
Grade		Study 1 TS ^b	Study 2 TS
2nd	CS ^a	.822***	.647**
7th	CS	.561*	.607**
College	CS	.012	.245

Note: ^aConnective Score, ^bTheme Score

* $p < .05$

** $p < .02$

*** $p < .01$



Experiment 1

Example Story from WISC-R Manual

First, the lady is walking toward the scale.

Then she weighs herself. Finally, she walks away.

Experiment 2

Example Story Corresponding to a Canonical Story (Stein & Glenn)

One day Mabel passed a scale on her way home from shopping. She decided she better find out if her diet was working. She stepped up onto the scale and put her money in. The scale showed she had gained weight. Mabel was surprised at first, but then she thought it must be a broken scale anyway.

Figure 1. Example picture sequence for WISC-R Picture Arrangement task with two versions of a corresponding story.